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Surface structural characterization of polymer composite insulators for improved weather resistance

Research Details			
Competition Year:	2017	Fiscal Year:	2017-2018
Project Lead Name:	Hore, Dennis	Institution:	University of Victoria
Department:	Chemistry	Province:	British Columbia
Award Amount:	\$40,000	Installment:	1 - 2
Program:	Collaborative Research and Development Grants	Selection Committee:	RPP Internal Decision Cttee
Research Subject:	Materials structure, properties and testing	Area of Application:	Electrical energy
Co-Researchers:	Wulff, Jeremy	Partners:	ASAsoft (Canada) Inc.

Award Summary

Polymer-based materials are promising for use in insulators for electrical power lines as an alternative to current glass or ceramic designs. The plastic structures can offer increased electrical resistance, lower manufacturing and installation cost, and be of lighter weight. However, there is still work to be done in terms of formulating the material so that it can withstand the extreme summer and winter conditions of Canadian climates. A large challenge in this area is chemical resistance to de-icing agents. To date, testing of some materials such as silicone and EPDM (ethylene propylene diene monomer) rubbers has been carried out, and some general findings exist, but it remains to be understood how the materials respond to weathering under their electrical load. In this proposal, a combination of surface-specific spectroscopy, microscopy, and macroscopic measurements of the hydrophobicity will be carried out. The aim is to identify which materials perform the best under specific sets of chemical and physical conditions, and to be able to provide some molecular-level explanation for any observed degradation in material performance. At the same time, this project provides many opportunities for training the next generation of scientists in advanced chemical structure and materials characterization methods.

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